

Advanced Chemistry
Temperature and Rate

NAME: _____ **PER:** _____

Concept Questions

- As the temperature of a reaction is increased, the rate of the reaction increases because the _____.
A) reactant molecules collide more frequently and with greater energy per collision
B) activation energy is increased
C) reactant molecules collide less frequently and with greater energy per collision
D) reactant molecules collide more frequently with less energy per collision
- The rate of a reaction depends on _____.
A) collision frequency
B) collision energy
C) collision orientation
D) all of the above
E) none of the above
- In the energy profile of a reaction, the species that exists at the maximum on the curve is called the _____.
A) product
B) activated complex
C) activation energy
D) enthalpy of reaction
E) atomic state
- Generally, which of the following rate constants would have the fastest reaction rate?
A) 0.00258 s^{-1}
B) 0.452 s^{-1}
C) 0.0852 s^{-1}
D) 0.00369 s^{-1}
- In the Arrhenius equation, $k = Ae^{-E_a/RT}$, _____ is the frequency factor.
A) k
B) A
C) e
D) E_a
E) R
- In general, as temperature goes up, reaction rate _____.
A) goes up if the reaction is exothermic only
B) goes up if the reaction is endothermic only
C) goes up regardless of whether the reaction is exothermic or endothermic
D) stays the same regardless of whether the reaction is exothermic or endothermic
E) stays the same if the reaction is first order
- Which factor(s) was incorporated in the Arrhenius Equation?
A) The fraction of molecules possessing energy E_a or greater
B) The number of collisions per second
C) The fraction of collisions that have the appropriate orientation
D) B & C
E) A, B, and C
- _____ reactions have reaction coordinate diagrams where the products have a higher energy than the reactants.
A) epithermic
B) equilibrium
C) endothermic
D) exothermic
- Generally, as the temperature increases, the rate constant (k) _____.
A) increases
B) decreases
C) stays the same
D) fluctuates
- Based on the collision theory, as the reactant concentration decreases, the number of collisions _____.
A) increases
B) decreases
C) stays the same
D) fluctuates

11. Which of the following molecular speeds would result in more energy and therefore faster reaction rates?

- A) 242 m/s
- B) 36 m/s
- C) 144 m/s
- D) 7.3 m/s

12. The minimum energy needed to initiate a chemical reaction is the _____

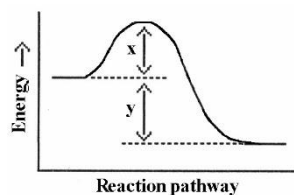
- A) activation energy
- B) potential energy
- C) enthalpy
- D) entropy

13. _____ diagrams are used to visualize energy changes throughout the process of a reaction.

- A) phase diagrams
- B) reaction coordinate diagrams
- C) equilibrium diagrams
- D) collision diagrams

17. Which energy difference in the energy profile to the right corresponds to the activation energy for the forward reaction?

- A) x
- B) y
- C) x + y
- D) x - y
- E) y - x



14. Generally, the lower the E_a (activation energy), the _____ the reaction.

- A) faster
- B) slower
- C) constant
- D) none of the following above

15. _____ reactions have reaction coordinate diagrams where the products have lower energy than the reactants.

- A) epithermic
- B) equilibrium
- C) endothermic
- D) exothermic

16. As magnitude of (activation energy) increases, the rate constant _____.

- A) increases
- B) decreases
- C) does not change
- D) fluctuates